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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : F42B 12/40	A1	(11) International Publication Number: WO 94/28371
		(43) International Publication Date: 8 December 1994 (08.12.94)

(21) International Application Number: PCT/US94/06054
(22) International Filing Date: 31 May 1994 (31.05.94)

(30) Priority Data:
08/069,608 1 June 1993 (01.06.93) US
08/139,399 19 October 1993 (19.10.93) US

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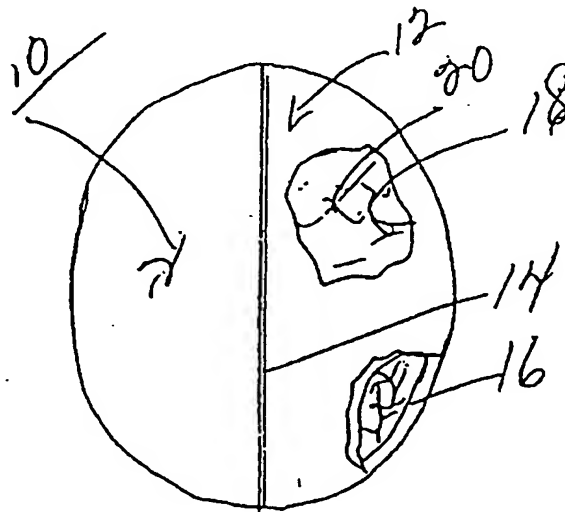
(81) Designated States: AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, LV, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: PRECISION SHOOTING AERODYNAMIC NON-SPHERICAL SAFETY-ORIENTED PROJECTILE

(57) Abstract

An improved, precision shooting, safety oriented, high speed projectile (10) comprising a non-toxic, soft, hollow, capsule (12) formed of a plurality of portions joined together at at least one seam line (14), said seam line (14) being the weakest point of the capsule (12), with the greatest length of the capsule (12) alignable along the length of a gun barrel, whereby said capsule (12) will generally consistently impact on an essentially predetermined portion of the capsule (12) relative to the centerline of the initial direction of flight of the capsule and a colored, non-toxic, fill material disposed in said capsule (12) for ejection therefrom, the angle of at least one seam line (14) being generally consistent relative to the centerline of the initial direction of flight, upon rupture of said capsule (12) at at least one seam line (14) upon impact of said projectile (10) on a soft solid target. The capsule (12) is preferably elastic gelatin.



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1 PRECISION SHOOTING AERODYNAMIC NON-SPHERICAL
2 SAFETY-ORIENTED PROJECTILE

3
4 BACKGROUND OF THE INVENTION

5
6 FIELD OF THE INVENTION

7
8 This invention generally relates to projectiles and
9 more particularly relates to a novel, precision shooting,
10 aerodynamic, non-spherical, safety-oriented projectile
11 comprising a non-toxic, soft, elastic gelatin, usable for
12 police activities, mock hunting, games, sports, military
13 activities, and the like including but not limited to those
14 commonly referred to as Paintball, Adult War Games,
15 Adventure Games, Action Pursuit Games, etc.

16
17 DESCRIPTION OF THE PRIOR ART

18
19 The use of spherical and non-spherical metallic and/or
20 rubber/plastic projectiles, for the purpose of causing
21 bodily harm or impairment to human beings and/or animals, in
22 a variety of guns is well known. The use of such metallic,
23 and/or rubber/plastic projectiles/bullets presents inherent
24 safety problems and risk of bodily harm and/or impairment
25 when such projectiles are deliberately fired at people or
26 animals in activities such as, but not limited to, Adventure
27 Games, police training, military exercises, mock hunting,

1 sports, and games. Use of known metallic and/or
2 rubber/plastic projectiles/bullets can also substantially
3 and unacceptably damage the general environment.

4
5 The use of a soft gelatin capsule in a method for
6 marking trees with a marking fluid has been described in
7 U. S. Patent No. 3,861,943. According to that description
8 the gelatin capsule has a wall thickness from 0.02 inches to
9 0.03 inches and a diameter of 0.25 inches to 0.75 inches.
10 The capsule contains from 0.25 cc to 1.25 cc of marking
11 fluid, generally a pigmented liquid such as an oil-based
12 paint, or the like, useful for marking stationary articles,
13 such as trees. However, this marking capsule would present
14 certain disadvantages in other applications, such as
15 projectiles for Adventure Games. In particular, the amount
16 and/or type of fluid in the capsule inhibit precision
17 shooting, due to the fact that the shape of the capsule is
18 based on the amount of fluid contained therein. As a
19 result, the capsule generally is unacceptably inaccurate for
20 precision shooting. It operates at velocities of 50 to 200
21 feet per second and cannot be used for anything other than
22 very short range shooting with any degree of accuracy,
23 whereas Adventure Games activities need a much greater
24 accuracy range, are often shot at smaller targets, which
25 often move, and often shoot back, while operating at
26 velocities preferably about 250 feet per second to about 325
27 feet per second with potentially higher velocities involved

1 in the mock hunting activity. If such capsules containing
2 indelible fluids were used in Adventure Games the resulting
3 staining would be difficult or impossible to wash clean from
4 clothing, buildings, or the accessible general environment.
5 Also, such breakage, when applied to Adventure Games or mock
6 hunting, present a very high possibility of accidental
7 ingestion by a human being or deliberate ingestion by a
8 animal that could be chemically harmful to the human or the
9 animal. Moreover, breakages of the capsules containing
10 indelible fluids would be harmful to the environment and
11 protected trees, such as Oak trees.

12

13 The use of a soft gelatin capsule containing marking
14 fluid in a marking method for target shooting on a
15 stationary non-soft target or the like has been described in
16 U. S. Patent No. 4,656,092. According to that description,
17 a target shooting capsule is used which comprises a
18 substantially spherical, non-toxic, soft, elastic, seamless
19 gelatin capsule having a dry wall thickness of about 0.004
20 inches to about 0.013 inches, having a diameter of about
21 0.16 inches to about 0.265 inches, and containing about 0.03
22 cc to about 0.12 cc of a water-washable, non-toxic, dye fill
23 material. The substantially spherical capsule was designed
24 and intended to impact on a relatively non-soft, solid, and
25 stationary target. However, the substantially spherical
26 capsule has certain disadvantages in other applications such
27 as Adventure Games. In particular, it would have to be

1 fired at a much higher velocity in order to break upon and
2 mark a soft solid target, such as a human or animal, because
3 the force needed to break the seamless capsule is much
4 greater than that required to break a multi-piece seamed
5 capsule. As a result, the substantially spherical capsule
6 could cause unacceptable bodily harm and/or impairment to a
7 human or animal. Moreover, a substantially spherical
8 capsule is generally not spin stable and therefore
9 inaccurate when compared to an aerodynamic, non-spherical,
10 spin stable, projectile.

11

12 There exists today in the public domain a substantially
13 spherical capsule utilized primarily, but not exclusively,
14 for Adventure Games. This gelatin capsule has a wall
15 thickness of about 0.010 inches to 0.020 inches with a
16 diameter of about 0.500 inches to about 0.700 inches and is
17 substantially spherical. This substantially spherical
18 capsule being manufactured with a diameter of approximately
19 .500 inches, .620 inches and .680 inches with the
20 disadvantages and advantages of each hotly disputed within
21 the industry, both verbally and in print. The .680 inch
22 diameter is today the principal capsule of choice in
23 practice. This substantially spherical capsule consists of
24 two gelatin strips connected together by a rotary die
25 process, which results in the substantially spherical
26 capsule having a seam and containing a non-toxic dye fill
27 material which is water washable.

1 This substantially spherical capsule has serious
2 disadvantages because it is substantially spherical. In
3 particular, because the substantially spherical capsule is
4 fed into a gun primarily by a gravity feed method, there is
5 no way to consistently control the positioning of the seam
6 in the gun barrel. As a result, not only will the
7 substantially spherical capsule generally strike the soft
8 solid target randomly with respect to the seam, it may not
9 strike the soft solid target with any portion of the seam at
10 all. The seam is the weakest part of the substantially
11 spherical capsule and almost all breakages of the
12 substantially spherical capsule, as a result of impact on a
13 soft solid target, first occur somewhere on or along the
14 seam line. Consequently this requires that the capsule be
15 consistently fired at a greater velocity in order to cause a
16 break on the seam line of the substantially spherical
17 capsule without the necessity of impacting on the seam line,
18 which in a safety oriented recreational activity such as
19 Adventure Games is a very undesirable condition.

20

21 As another result of not impacting primarily on the
22 seam line, if at all, the substantially spherical capsule
23 will quite often simply bounce off the soft solid target
24 without breaking. If the activity is Adventure Games and
25 the soft solid target is an opposing player and the
26 substantially spherical capsule bounces off this player,

27

1 this results in the player that was impacted not being
2 called out of the game even though the players, because of
3 the impact, might think this is the case. This can cause
4 confusion, bad feelings, and arguments and necessitates that
5 the player must be shot again to achieve the necessary mark
6 in order to remove said player from the game. Such is an
7 unsafe and undesirable result to the shooter, shootee, and
8 the playing arena owner who may assume liability for the
9 activities to some extent.

10

11 Accuracy of the substantially spherical capsule is
12 generally inconsistent because the capsule generally does
13 not rotate/spin about an axis along the direction in which
14 the substantially spherical capsule is traveling and because
15 the capsule is commonly fired from a smooth barrel it tends
16 to develop a spin/rotation. Even given the condition that
17 would cause the substantially spherical capsule to
18 consistently spin/rotate about an axis along the direction
19 in which the substantially spherical capsule is traveling,
20 the random placement of the seam could, in flight, tend to
21 cause frictional force which is asymmetric, relative to the
22 direction of motion, at the seam line because the seam line
23 would not consistently be either parallel to or
24 perpendicular to the initial direction of flight, resulting
25 in loss of shooting accuracy. Manual placement of the
26 substantially spherical capsule would defeat the purpose of
27 pump action and semi-automatic action guns which

1 dramatically dominate the marketplace. Manual placement
2 would still, if attempted, present inherent placement
3 accuracy problems based on human error and even then the
4 substantially spherical capsule would tend not to
5 consistently maintain this alignment relative to the
6 centerline of the initial direction in flight. This
7 resulting inaccuracy of the substantially spherical capsule
8 is common and undesirable.

9
10 The substantially spherical capsule tends not to leave
11 a consistent mark on soft solid targets such as a human or
12 animal body. Because of the seam's random position upon
13 impact, the marking capability of the substantially
14 spherical capsule can be anywhere from near zero to near
15 maximum, inasmuch as the marking fluid will tend to be
16 expelled through the seam first, which is frequently not in
17 the direction of flight. This causes part or all of the
18 marking fluid to have its destination at places other than
19 the point of impact. This is undesirable when applied to
20 Adventure Games in that certain size marks, depending upon
21 the playing arena, are required to remove the player from
22 the game. Furthermore, the mark left on the player is not
23 required to be circular, simply the required size when
24 considered in total, at the primary point of impact and
25 marks not at the primary point of impact are not considered
26 into the total mark size.

27

1 Accordingly, there has been a felt but unfulfilled need
2 for a precision shooting, aerodynamic, non-spherical, safety
3 oriented projectile which shoots reliably, requires less
4 initial velocity than that of a comparable substantially
5 spherical capsule of approximately the same mass, weight and
6 volume to travel the same distance, and will generally
7 impact on the same portion of the projectile and in
8 generally the same manner for uniformity in marking the
9 target upon impact, with improved spin stability, safety,
10 and accuracy. Moreover, the projectile should be
11 inexpensive and easy to use and be accurate to shoot, even
12 at comparatively long range.

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1 SUMMARY OF THE INVENTION

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4 The improved precision shooting, aerodynamic, non-
5 spherical, safety oriented projectile of the present
6 invention satisfies all the foregoing needs.
7

8 The invention provides a precision shooting aerodynamic
9 non-spherical safety oriented projectile comprising a non-
10 toxic, soft, aerodynamically shaped, hollow, non-spherical,
11 high speed capsule of elastic gelatin or the like, with a
12 non-toxic, water washable, colored fill material disposed in
13 the hollow interior thereof. The capsule comprises two or
14 more portions joined at one or more easily rupturable seam
15 lines, with the capsule's longest length being along the
16 length of a gun barrel. The gelatin capsule is consistently
17 accurately and substantially filled but need not be entirely
18 filled with the colored non-toxic fill material, but is
19 generally uniform from capsule to capsule in size, shape,
20 quantity of colored non-toxic fill material the soft elastic
21 gelatin capsule of the invention is fabricated by the
22 current state of the art rotary die process of the type
23 employed to make vitamin, such as vitamin E, and medication
24 capsules.
25

26 The precision shooting aerodynamic non-spherical safety
27 oriented projectile is comparable aerodynamically to non-

1 spherical metallic and/or rubber/plastic projectiles for
2 improved accuracy and decreased frictional force while in
3 flight.

4
5 In particular embodiments, the projectile may be
6 configured in the form of a pointed cylinder, i.e. bullet-
7 shaped; in other embodiments the projectile may have at
8 least two seams, in some applications substantially
9 perpendicular to one another. Other embodiments of the
10 invention include dual pointed generally cylindrical,
11 generally oval and generally ellipsoidal configurations.

1 BRIEF DESCRIPTION OF THE DRAWINGS

2

3

4 Fig. 1 is a top plan view, somewhat schematic and
5 partly broken away, of an embodiment of the improved
6 projectile of the present invention;

7

8 Fig. 2 is a top plan view, somewhat schematic and
9 partly broken away of an alternative embodiment of the
10 invention;

11

12 Fig. 3 is a top plan view, somewhat schematic and
13 partly broken away, of an preferred embodiment of the
14 invention; and

15

16 Fig. 4 is a top plan view, somewhat schematic and
17 partly broken away, of a further alternative embodiment of
18 the invention.

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1 DETAILED DESCRIPTION OF THE INVENTION

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4 Referring more particularly to Fig. 1, a first
5 embodiment of the improved, precision shooting, aerodynamic,
6 non-spherical, safety oriented, non-toxic projectile,
7 hereinafter referred to as the "improved projectile", of the
8 present invention is schematically depicted therein. The
9 improved projectile 10 is specially adapted for, but not
10 limited to, safe use in games, military activities, police
11 activities, mock hunting and sports, particularly those in
12 which the improved projectile is to be fired at, hit, and
13 mark soft solid targets such as humans or animals. One such
14 sport is called Adventure Games, the object of which is for
15 a player to eliminate opposing players from the game by
16 striking them with a marking projectile shot from a gun.

17
18 Improved projectile 10 comprises a soft, hollow, non-
19 toxic capsule 12 of elastic gelatin or the like, where
20 capsule 12 is non-spherical, its greatest length being
21 alignable along a gun barrel's length (not shown). Capsule
22 12 comprises preferably, but is not limited to, two portions
23 joined together at seam line 14, preferably centered,
24 disposed on the length of capsule 12.

25
26 Improved projectile 10 is non-toxic and contains a
27 water washable colored fill material that is non-toxic. As

1 will be apparent from the detailed description below, the
2 improved projectile 10 has the advantage of consistently
3 predetermining, without direct manual placement, the angle
4 of the seam(s) in the gun barrel in relation to the
5 centerline of the initial direction of flight whether fed
6 into the gun by gravity, pressure, spring, or hand. As a
7 result, improved projectile 10 can: 1. consistently impact
8 primarily on, adjacent or along its weakest portion, which
9 is seam line 14, thereby substantially promoting safety
10 interests which is highly desirable. 2. consistently impact
11 primarily on or along its weakest portion, which is seam
12 line 14 whereby it is more likely to burst resulting in
13 bounces off the soft solid target without breakage. 3.
14 consistently impact primarily on adjacent or along seam line
15 14 whereby the marking capability of improved projectile 10
16 is not only rendered consistent but the mark will generally
17 be substantial. 4. achieve superior accuracy because a
18 consistent and stable spin can be achieved about the longest
19 axis resulting in superior flight stability and in some
20 applications making the effect of an asymmetric seam line
21 negligible for practical purposes. 5. have superior or equal
22 distance capability with lower muzzle velocity for
23 additional safety or will provide greater distance shooting
24 without essentially changing safety requirements. 6. as a
25 result of seam line 14 being placed in the plane of the
26 initial direction of flight of the improved projectile, any
27 frictional force will have negative effect on accuracy.

1 7. eliminate the tendency to roll forward into the barrel
2 resulting in double feeding which could cause bursting of
3 the capsules in the barrel. 8. have a seam line generally
4 perpendicular to the initial direction of flight, with seam
5 line 14 removed, whereby any frictional force caused by seam
6 line 14 is relieved. 9. have at least one sea, crease,
7 ridge, or score line generally perpendicular or generally
8 parallel or otherwise to the centerline of the initial
9 direction of flight, in addition to seam line 14, whereby
10 breakage of the projectile is facilitated. 10. by forming
11 the front of improved projectile 10 to a point, rounded or
12 otherwise, gyroscopic properties are achieved providing
13 superior flight stability and accuracy.

14 Capsule 12 can vary in size and shape, as desired, in
15 accordance with the invention. Capsule 12 is generally
16 ellipsoidal. In Fig. 1, the greatest width of capsule 12
17 being preferably substantially equal to 0.300 inches to
18 0.750 inches, the length of capsule 12 being preferably
19 substantially equal to 0.400 inches to about 2.000 inches
20 long. Capsule 12 comprises a shell or wall 16 defining a
21 hollow interior space 18. Preferably wall 16 has a
22 substantially uniform thickness of 0.004 inch to 0.030 inch
23 and within space 18 that colored non-toxic fill material 20
24 of improve projectile 10 is disposed. Wall 16 preferably
25 has wall thickness of .004 to .019 inch for Adventure Game
26 use and for mock hunting applications involving small or
27 fragile targets, such as rabbits. Larger wall thicknesses

1 are usable in applications, such as mock hunting involving
2 large or sturdy animals, where harder impacts are not
3 undesirable. The thicknesses given are dry wall thickness
4 i.e. thickness of the walls when they are dry after
5 manufacturing. Because rupture occurs at adjacent or along
6 the seam line, the wall thickness in this region is of
7 primary import.

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1 Capsule 12 can be formed by a conventional processing
2 technique commonly referred to as the rotary die process,
3 such as is used to fabricate capsules of vitamins or
4 medications. The process may proceed from any suitable
5 mixture of materials, such as, for example, those described
6 in the following description. A brief description of this
7 conventional rotary die process will suffice. The basic
8 ingredients of the capsule 12 shell portions comprise
9 primarily gelatin with other various ingredients to achieve
10 the desired gelatin composition. Preferably used
11 preservatives are methyl and propylparabens and sorbic acid.
12 Certified dyes are preferably used when color is desired.
13 Titanium Dioxide is preferably used to produce opaque
14 capsules. The variety of colors that can be opaque or
15 transparent are colored transparent, colored opaque, natural
16 transparent, two-tone opaque, two-tone transparent and two-
17 tone transparent opaque. Random camouflage patterns
18 consisting of two or more colors can be induced by combining
19 the melted gelatin in the final encapsulation tank and
20 stirring it slowly and/or infrequently. Flavoring agents,
21 including but not limited to Ethyl Vanillin, Essential Oils,
22 or Methionine, and/or scent agents, may also be employed in
23 the capsule shell and/or fill material. Following a basic
24 pre-determined formula the gelatin and other ingredients are
25 mixed and melted in large stainless steel vacuum melters
26 located on an elevated platform above the preparation room.
27 This elevation permits gravity feeding into the stainless

1 steel receiving and transfer tanks, which are water jacketed
2 for heating purposes to maintain the gelatin temperature
3 within required tolerances. Appropriate dyes and/or
4 titanium dioxide can be added in the transfer tanks, if
5 required, for coloring purposes. Both the viscosity and
6 temperature of the gelatin must be held within relatively
7 narrow specifications to insure quality manufacturing. All
8 fill material ingredients, both solids and liquids are pre-
9 weighed and transferred to stainless steel blending tanks
10 where they are adequately mixed to obtain a uniform product.
11 The mixing is accomplished through the use of (variable)
12 mixers. If necessary, the mixture is put through a
13 homogenizing process which breaks up agglomerates of solids
14 and insures that all solids are wet with the liquid base.
15 Again, if required the mixture is deaerated and transferred
16 into stainless steel tanks ready for encapsulation. Two
17 transfer tanks, one containing gelatin and the other the
18 non-toxic colored fill material are hung over the soft
19 capsule machine. A continuous flow of gelatin is supplied
20 to a metering device and thus metered onto air cooled
21 rotating drums forming a gelatin ribbon. These two ribbons
22 of gelatin roll down between the rotary dies, becoming taut
23 and somewhat stretched. A continuous flow of the non-toxic
24 colored fill material is supplied to a displacement pump
25 which controls the fill weight of the capsule to be produced.
26 When the capsule is approximately half formed, the non-toxic
27 colored fill material is literally exploded through orifices

1 in a heated wedge segment to force the gelatin ribbon into
2 the die pockets where capsules are simultaneously shaped,
3 filled, hermetically sealed and cut from the gelatin
4 ribbons. Regular monitoring of fill weights, seal
5 thickness, uniformity of shape and general appearance is
6 carried out during the encapsulation process. If required,
7 the freshly formed capsules are conveyed to a washer. After
8 washing to remove any oil residues the capsules are
9 transferred to tumbler driers for initial drying. As
10 capsules are discharged from the drier they are spread on
11 shallow trays and moved into a drying room to complete the
12 drying process. After completion of drying the capsules may
13 be washed and cleaned using a solvent and centrifuge
14 equipment. The capsules are then examined for visual
15 defects such as poor seals, poor uniformity of shape,
16 leaking capsules or other defects. They may also be
17 processed through sizing equipment to sort out any under or
18 oversized capsules. Using statistically reliable sampling
19 techniques quality control personnel verify the physical
20 standards of size, shape, color, weight, moisture content
21 and seal integrity. The capsules are then released for
22 counting, packaging, and shipment. By this process
23 projectile 10 is accurately filled, i.e. within relatively
24 narrow tolerances.

25

26 Fill material 20 is non-toxic, water washable, of
27 conventional type and is of a variety of colors, including

1 black and white, preferably colors that show up well on
2 various camouflage clothing or animal skin/fur. Fill
3 material 20 may also contain flavoring and/or scent agents.
4 The description hereinabove describes an
5 example of how fill material 20 is created. Ingredients
6 should not be used in fill material 20 which could not be
7 washed from the clothing or skin of humans and/or animals or
8 the general environment that is accessible to washing.
9 Therefore, oil-base pigments and initially water soluble
10 paints which set to a water insoluble state, for example so
11 called tempera paints preferably should not be used in fill
12 material 20.

13

14 The amount of fill material 20 in capsule 12 will vary,
15 depending on the size of capsule 12. Capsule 12 need not be
16 entirely filled with fill material 20, but only that, for
17 maximum shooting accuracy, a plurality of capsules 12 be
18 substantially identical to each other in size, shape and
19 weight and have about the same volume of fill material 20
20 therein. Typically, fill material 20 will be present in
21 capsule 12 in an amount preferably substantially equal to
22 0.011 cubic inches to 0.347 cubic inches. That is generally
23 sufficient, although visibility and weight requirements may
24 vary depending on the activity and target, to mark a soft
25 solid target, such as a human or animal, impacted by
26 improved projectile 10.

27

1 Improved projectile 10 is loadable into a gun barrel
2 (not shown) so that seam line 14 extends along the length of
3 the gun barrel. Capsule 12 is sized with respect to the gun
4 barrel so that it can fit into the barrel only this way.
5 That is, capsule 12 at its greatest length will not fit into
6 the barrel sideways, but the greatest width of capsule 12 is
7 such that capsule 12 is slidably received in the gun
8 barrel. Since each capsule 12 is essentially uniform in
9 fill and stable in dimensions it is loadable the same way
10 into the gun barrel. The portion of capsule 12 that impacts
11 the soft solid target is generally consistent relative to
12 the centerline of the initial direction of flight and the
13 angle of seam line 14 relative to the centerline of the
14 initial direction of flight is generally consistent upon
15 impact of a soft solid target. Capsule 12 will generally
16 retain these alignments while in flight because capsule 12
17 is substantially spin stable. When improved projectile 10
18 impacts upon a soft solid object such as a human or animal,
19 it will generally break first at, adjacent or along seam 14
20 making the desired mark while promoting safety interests.

21

22 Improved projectile 10, although soft with
23 elastic properties, essentially will retain its shape when
24 fired from a gun or the like, and is still strong enough not
25 to accidentally rupture, under normal use, in the gun
26 barrel. Improved projectile 10 is inexpensive to make,
27 relatively easy to store and has superior aerodynamic,

1 safety, marking, and accuracy properties which make it
2 highly desirable for use in Adventure Games, among other
3 activities.
4

5 A second embodiment of the improved projectile of the
6 present invention is schematically depicted in Fig. 2 as
7 improved projectile 10a. Components thereof similar to
8 those of improved projectile 10 of Fig. 1 bear the same
9 numerals but are succeeded by the letter "a".
10

11 Improved projectile 10a is identical to improved
12 projectile 10, except that projectile 10a has an additional
13 seam line 30 perpendicular to the longest axis of improved
14 projectile 10a and designed to further facilitate breakage
15 of improved projectile 10a when it hits a soft solid target.
16 Improved projectile 10a has the other advantages of improved
17 projectile 10.
18

19 A preferred and third embodiment of the improved
20 projectile of the present invention is schematically
21 depicted in Fig. 3 as improved projectile 10b. Components
22 thereof similar to those of improved projectile 10 bear the
23 same numerals but are succeeded by the letter "b".
24

25 Improved projectile 10b is identical to improved
26 projectile 10, except that projectile 10b has a pointed
27 front end 40 and a pointed rear end 50 in which seam line

1 14b is disposed, for easier loading into ammo containers, or
2 the like, and a greater gyroscopic effect thereby promoting
3 additional accuracy. Improved projectile 10b has the other
4 advantages of improved projectile 10.

5
6 A fourth embodiment of the improved projectile of the
7 present invention is schematically depicted in Fig. 4 as
8 improved projectile 10c. Components thereof similar to
9 those of projectile 10a bear the same numerals but are
10 succeeded by the letter "c".

11
12 Improved projectile 10c is identical with projectile
13 10a, except on the longest axis seam line 14a is missing
14 from projectile 10c, which, however, does have seam line 30c
15 which is generally perpendicular to the longest axis whereby
16 any frictional force that may be caused by seam line 14a is
17 relieved.

18
19 It will be understood that, if desired, at least one
20 score, seam, ridge, or crease line (not shown) could be used
21 in addition to the described seam lines, to facilitate
22 flight stability and/or rupturing of the improved projectile
23 on impact with a soft solid target, in accordance with the
24 invention.

25
26 Various other modifications, changes, alterations and
27 additions can be made in the improved projectile of the

1 present invention, its components and their parameters. All
2 such modifications, changes, alterations and additions as
3 are within the scope of the appended claims form part of the
4 present invention, which is defined by the appended claims
5 construed in light of the specification and claims.

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1 WHAT IS CLAIMED IS:

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3 1. An improved soft, hollow, safety oriented high speed
4 projectile comprising, in combination:

- 5 a) a non-toxic, soft, hollow, safety oriented, high
6 speed capsule formed of a plurality of portions
7 joined together at at least one seam
8 line, said seam line being the weakest point of
9 the capsule, the greatest length of the capsule
10 being alignable along the length of a gun barrel,
11 whereby said capsule will consistently impact on
12 an essentially predetermined portion of the
13 capsule; and,
14 b) a colored, non-toxic, fill material disposed in
15 said capsule for ejection therefrom
16 upon rupture of said capsule
17 upon impact of said projectile on a soft solid
18 target.

19

20 2. The improved projectile of Claim 1 wherein
21 said colored non-toxic, fill material is water-soluble and,
22 when dried, is

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1 readily washable from human and animal skin, clothing, and
2 the accessible general environment.

3

4 3. The improved projectile of Claim 1 wherein said capsule
5 comprises elastic gelatin.

6

7 4. The improved projectile of Claim 1 wherein said capsule
8 is accurately and at least partially filled to retain a
9 stable configuration when sorted and handled properly.

10

11 5. The improved projectile of Claim 1 wherein the length of
12 said capsule is substantially equal to 10 percent to 166
13 percent greater than the greatest width.

14

15 6. The improved projectile of Claim 5 wherein said capsule
16 has a dry wall thickness at or adjacent said at least one
17 seam line, substantially equal to .004 inch to .019 inch,
18 a length substantially equal to 0.400 inches to 2.000 inches
19 and the greatest width is substantially equal to 0.300
20 inches to 0.750 inches, and wherein said capsule contains
21 substantially equal to 0.011 cubic inches to 0.347 cubic
22 inches of colored, non-toxic, water washable, fill material.

23

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1 7. The improved projectile of Claim 5 wherein said
2 capsule's greatest width is dimensioned so as to essentially
3 fit the bore of a gun barrel.

4

5 8. The improved projectile of Claim 7 wherein said capsule
6 is generally comparable in shape to non-spherical lead,
7 steel, plastic, and rubber projectiles for improved
8 accuracy.

9

10 9. The improved projectile of Claim 1 wherein said capsule
11 is generally ellipsoidal in configuration.

12

13 10. The improved projectile of Claim 9 wherein said capsule
14 forms a point, rounded or otherwise, on at least one end.

15

16 11. The improved projectile of Claim 1 wherein said capsule
17 is generally cylindrical in shape.

18

19 12. The improved projectile of Claim 11 wherein said
20 capsule forms a point, rounded or otherwise, on at least one
21 end.

22

23 13. The improved projectile of Claim 1 wherein said capsule
24 is generally oval in shape.

25

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- 1 14. The improved projectile of Claim 13 wherein said
2 forms a point, rounded or otherwise, on at least one end.
3
- 4 15. The improved projectile of Claim 1 wherein said capsule
5 defines an indentation in at least one end.
6
- 7 16. The improved projectile of Claim 1 wherein said capsule
8 includes at least one protrusion at one end.
9
- 10 17. The improved projectile of Claim 1 further including at
11 least one crease therein.
12
- 13 18. The improved projectile of Claim 1 further including at
14 least one ridge thereon.
15
- 16 19. The improved projectile of Claim 1 further including at
17 at least one score line therein.
18
- 19 20. The improved projectile of Claim 5 wherein said capsule
20 has a dry wall thickness, at or adjacent said at least one
21 seam line, substantially equal to 0.020 inch to 0.030 inch,
22 a length substantially equal to 0.40 inch to 2.00 inches,
23 and the greatest width is substantially equal to 0.30 to
24 0.75 inch, and wherein said capsule contains substantially
25 equal to 0.011 cubic inch to 0.347 cubic inch of colored,
26 non-toxic, water-washable fill material, whereby said
27 capsule is usable with velocities exceeding substantially

1 300 feet per second and with respect to more durable or
2 larger targets.

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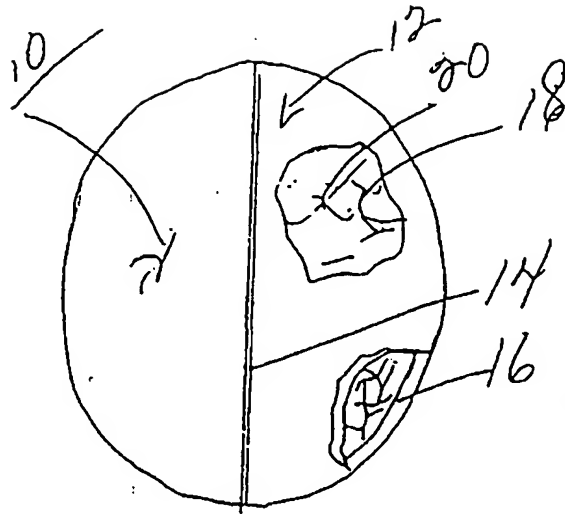


Fig. 1/4

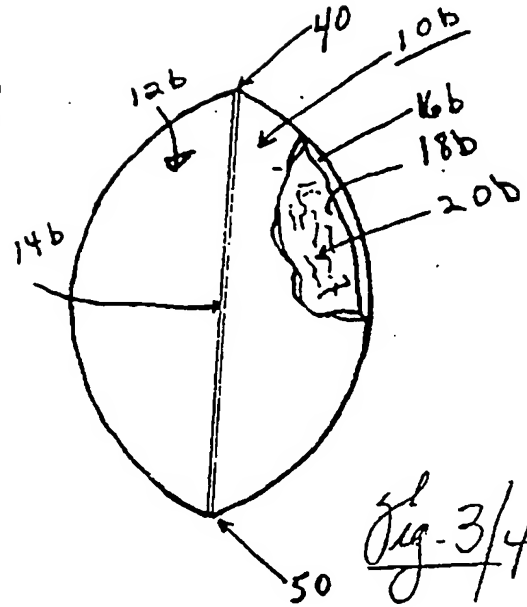


Fig. 3/4

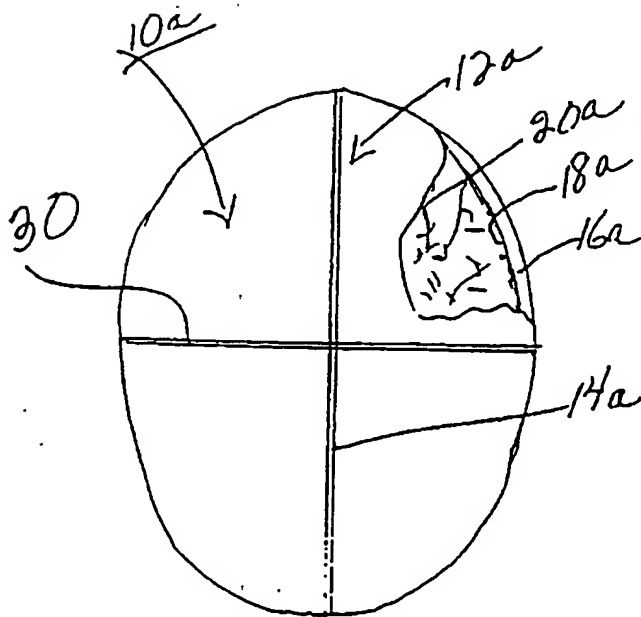


Fig. 2/4

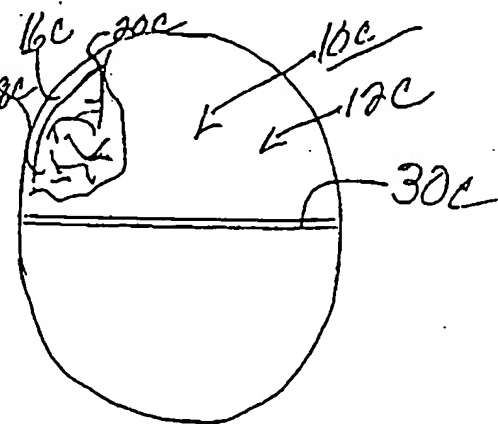


Fig. 4/4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US94/06054

A. CLASSIFICATION OF SUBJECT MATTER

IPC(SI) : F42B 12/40

US CL : 102/513

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. 102/444,501,502,513,529;273/418,428

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 4,634,606 (SKOGG) 06 JANUARY 1987, SEE COLUMN 2, LINES 11-25, COLUMN 4 LINES 26-60 AND COLUMN 5, LINES 11-17	1-8,20
Y	US, A, 5,164,538 (MC CLAIN III) 17 NOVEMBER 1992, SEE ENTIRE DOCUMENT	9-12,16,18
Y	US, A, 4,899,660 (BRIGHTON) 13 FEBRUARY 1990, SEE FIGURE 1	11,12
Y	US, A, 4,686,905 (SZABO) 18 AUGUST 1987, SEE COLUMN 4, LINES 11-14	13,14
Y	US, A, 5,035,183 (LUXTON) 30 JULY 1991 SEE ENTIRE DOCUMENT	15,19

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	*T	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be part of particular relevance	*X*	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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1 document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Z*	document member of the same patent family
* document referring to an oral disclosure, use, exhibition or other means		
* document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

20 JULY 1994

Date of mailing of the international search report

AUG 22 1994

 Name and mailing address of the ISA/US
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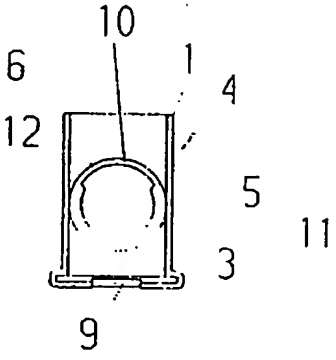
Telephone No. (703) 308-0497

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US94/06054

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 4,819,562 (BOWMAN) 11 APRIL 1989 SEE FIGURE 3, COLUMN 7, LINES 52-62	17
A	US, A, 3,861,943 (GRAINGER) 21 JANUARY 1975	
A	US, A, 4,656,092 (HAMAN ET AL) 07 APRIL 1987	
A.P	US, A, 5,254,379 (KOTSIPOULOS) 19 OCTOBER 1993	

<p>95-037132/06 A95 K03 MAYR/ 93.06.24 MAYR G *DE 4321041-A1 93.06.24 93DE-4321041 (95.01.05) F42B 3/04 Cartridge for self defence hand gun - has hollow plastics projectile body within cartridge sleeve filled with stimulant or soporific to burst on striking target C95-016676 Addnl. Data: MAYR G</p>	<p>A(12-T3D1) K(3-A1)</p>
<p>The cartridge has a sleeve contg. the propellant and the plastics hollow body projectile. The projectile body (6) bursts on striking the target. A propellant base is between the projective (6) and the propellant charge (3). The projectile (6) is filled with a stimulant (12) or a soporific, which is dispersed when the projectile fractures.</p> <p><u>USE</u> Used for a self defence hand gun.</p> <p><u>ADVANTAGE</u> The projectile can be fired effectively at a sufficient range to incapacitate the assailant without adversely affecting the firer. (JT)</p>	 <p>(5pp249DwgNo.3/5)</p> <p>DE 4321041-A</p>

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